

# INVESTIGATOR'S ANNUAL REPORT

## National Park Service

All or some of the information provided may be available to the public

<b>Reporting Year:</b> 2004	<b>Park:</b> Shenandoah NP						
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<b>Name:</b> James Galloway	<b>Phone:</b> 434-924-1303	<b>Email:</b> jng@virginia.edu					
<b>Permit#:</b> SHEN-2002-SCI-0025							
<b>Park-assigned Study Id. #:</b> SHEN-00280							
<b>Project Title:</b> Acidic Deposition Impacts on Natural Resources in Shenandoah National Park (Cooperative Agreement 4000-7-9002)							
<b>Permit Start Date:</b> Jun 01, 2002	<b>Permit Expiration Date</b> Jun 01, 2005						
<b>Study Start Date:</b> Jun 01, 2002	<b>Study End Date</b> Dec 31, 2004						
<b>Study Status:</b> Completed							
<b>Activity Type:</b> Research							
<b>Subject/Discipline:</b> Watershed Management / Assessment							
<b>Objectives:</b> To determine landscape sensitivity to acid deposition in Shenandoah National Park.							
<b>Findings and Status:</b> <p>This study documents the susceptibility of SNP soils to current and future acidification from atmospheric deposition. Soil base saturation values in SNP (especially on the siliciclastic bedrock) are very low. Modelling studies using these data suggest that weathering of base cations in the park is also very low. This fact combined with current losses of soil base cations from leaching by acid rain, suggest that the soils in SNP may remain damaged for quite some time in the future.</p> <p>This study also presents evidence that trends in tree-ring chemistry can in fact be used as an indicator of base cation depletion in a forest soil. Tree cores serve as a tangible historical timeline of local soil conditions. Assuming that a plant's uptake of a particular element is directly related to that element's availability in a soil, the process of soil acidification should show up in tree cores as declining trends in base cation concentrations, and that pattern was observed in some of the tree cores in SNP.</p> <p>This study integrated the various components of soils and surface water responses to acidic deposition in SNP. This integrated approach documents why the changes in soil and surface water are important for the biological resources in the park (trees, fish aquatic insects). The study establishes the</p>							

condition of the park is today with respect to soil and water acid-base status, where models say it used to be, and where models say it will be in the future. The MAGIC model was calibrated for 14 catchments in SNP and used to estimate the historical status of SNP soils and streams, and to predict the future responses.

All research is complete for this project. The final report is being prepared for submission and review. The findings will be presented in three volumes of the final report, and the calibrated model for the 14 SNP watersheds will be installed on SNP computers.

**For this study, were one or more specimens collected and removed from the park but not destroyed during analyses?**

No

**Funding provided this reporting year by NPS:**

0

**Funding provided this reporting year by other sources:**

0

**Fill out the following ONLY IF the National Park Service supported this project in this reporting year by providing money to a university or college**

**Full name of college or university:**

n/a

**Annual funding provided by NPS to university or college this reporting year:**

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